Government of Madras.

PUBLIC WORKS DEPARTMENT.

IRRIGATION.
ESTABLISHMENT.

Recd. } 1910. *Enclosures*

Regd. *Spare copies*

G.O., No. 4 I., 10th January 1910.

Periyar-Pambiyar Project

Ordered that a letter be despatched to the Government of India, Revenue and Agricultural Department, with a request to have the Pambiyar catchment surveyed by one of the Survey of India Parties.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Establishment.

Read—the following papers :—

I

G.O., No. 226 I., dated 17th June 1908.

Abstract.—Forwarding to the Government of India, for information, a copy of the Proceedings of this Government, passing orders on the report showing the results of the Periyar-Pambiyar investigation.

II

G.O., No. 2176, Revenue, dated 7th August 1909.
G.O., No. 2903, Revenue, dated 22nd October 1909.

III

Letter—from Mr. L. M. Jacob, c.s.i., Secretary to the Government of India, Public Works Department (Civil Works—Irrigation).
To—the Joint Secretary to the Government of Madras, Public Works Department, Irrigation Branch.
Dated—Calcutta, the 8th December 1908.
No.—2207 I.

With reference to your endorsement No. 227 I., dated the 17th June 1908, forwarding a copy of the Madras Government Proceedings regarding the progress made into the investigation of the Pambiyar Scheme for supplementing the supply of water of the Periyar Reservoir, I am directed to forward, for information, a copy of a note, dated the 11th November 1908, by the Inspector-General of Irrigation, on the scheme and to request that if the Governor in Council has no objection, the recommendations made therein may be given effect to.

Enclosure.

Note on the Pambiyar scheme, for supplementing the supply of water to the Periyar reservoir, Madras Presidency, by Mr. J. BENTON, C.I.E., Inspector-General of Irrigation, dated 11*th November* 1908.

Verbal opinion.—When on tour in Madras the Chief Engineer showed me the report and surveys of Mr. S. B. Murray, Executive Engineer, which now form part of the papers submitted to the Government of India with the local Government's letter No. 227 I., dated 17th June 1908. The surveys were then incomplete and as I considered it necessary to finish them I did not write any formal note on the same ; as far as I am now able to recollect I suggested as follows :—

(i) The advisability of surveys being made with the object of finding an offtake further upstream, which may serve to obviate the necessity for such a long tunnel, or for any tunnel at all. The report of the Executive Engineer proceeds on the assumptions that the dam site which he proposes on the Pambiyar is the only possible one, and to utilize it, that a 3-mile tunnel is unavoidable ; the latter assumption is justified but apparently not the former one.

(ii) That it is very desirable to find an offtake and alignment, which will answer for an open channel, since tunnels are very costly.

(iii) That the tunnel 3 miles in length appears to be prohibitive in cost, and I therefore disadvised detailed surveys of this work being made.

For reasons given below the stoppage of survey of the 3-mile tunnel does not appear to be a matter for regret, but the same is not the case as regards the survey of water sheds and levels of rivers.

2. *Tract unsurveyed.*—The tract is understood to be a very dense forest, where survey work is unavoidably very slow on account of the clearance which have to be carried out. The Government maps are understood to have the words "dark impenetrable forest" written on the tract under consideration; I was informed when on tour that the field work had actually been executed by the Survey department, but that an unfortunate forest fire consumed the papers.

3. *Surveys required.*—The surveys required appear in my opinion to be those which, with the least amount of labour and expenditure, will serve to show the following :—

(i) Location of the main water sheds and levels of the lower portions of these in the portions where it may probably be desired to bring an open supply channel, or one with a moderate amount of tunnelling, across to the next valley.

(ii) Levels at intervals of the Pambiyar and Meenar rivers up-stream of the offtake hitherto proposed which will serve to show whether an offtake can be found which will answer for an open channel throughout, or for one with a small amount of tunnelling.

(iii) The catchment areas of the likely sources of supply.

(iv) Sites suitable for storage, provided the Periyar lake will not answer either with or without raising of the existing dam at less cost than additional work elsewhere of this class.

The survey of the ridge lines is necessary, and I am sorry that this work was stopped through a misunderstanding.

4. *Periyar reservoir storage capacity.*—Storage requirements and possibilities remain to be investigated, if raising of the Periyar dam would meet requirements, it may be considered whether this could be effected at less cost with horizontal arches and buttresses on the down stream side, than by separate works; however storage works may be required for offtake purposes.

5. *Requisite extra storage.*—My note, dated 26th March 1906, shows as follows—

Gross commanded area	768,000 acres	
Culturable area	109,000 ,,	approximately.
Annual irrigation	157,000 ,,	

There is therefore abundant scope for extension of irrigation.

6. *Expenditure which would be justifiable.*—This will depend on the extra possible storage with the cost of providing the same, the cost of other works, and the estimated extra revenues; this question may now be investigated independently of the field work, since it may afford data which will at once serve to show whether very costly works are warrantable.

7. *Cost of tunnelling.*—On the Kalka-Simla Railway there are over 100 tunnels, and the experience gained there and on the Periyar tunnel shows as follows for the cost of blasting and removing of the rock; lining with brick-work would be extra.

Length of tunnel.	Cost per cubic foot.
Kalka-Simla Railway.	
MILES.	RS. A.
0 to ¼ ...	0 5
¼ to ½ ...	0 6
½ to ¾ ...	0 8
¾ to 1 ...	0 12
1 to 2 ...	0 14
Periyar tunnel.	
1·08 ...	0 12

8. In the case of a 3-mile tunnel the cost of the rock work alone is likely to be from Rs. 1–2–0 to Rs. 1–4–0 per cubic foot; the area of the tunnel is unlikely to be less than 60 square feet, and may be twice as much if the tunnel has to be lined with brick-work. The cost of an unlined 3-mile tunnel, together with cost of buildings, and percentage charges for establishment and tools and plant, is unlikely to be less than Rs. 16,00,000 while that of a lined one may amount to over Rs. 35,00,000. Nothing is stated as to the character of the rock, and whether lining with brick-work will be necessary. The local officers who are circumstanced to arrive at more correct estimates of the probable cost may estimate the cost differently; however their estimates are very unlikely to be such as to warrant a very costly work of this character being contemplated, when any chance of avoiding it remains to be investigated.

9. *Approximate estimate of cost of works.*—No rough estimate of the cost of works has apparently been attempted, although the data now available would apparently serve to admit of a preliminary one being prepared for the project as now proposed. The preparation of a rough estimate of this character would be useful to the local officers, since it would serve to show what works are permissible, and what will be prohibitive; however, even if the revenue prospects would warrant a 3-mile tunnel it is clearly advisable to establish beyond any doubt whether this work can be dispensed with.

10. *Gauging of the water.*—I need not say that it is advisable to continue gauging the water

11. *Conclusion.*—In conclusion I would recommend as follows :—

(i) Execution of surveys—*vide* paragraph 3 *supra.*

(ii) Carrying out of the investigations—paragraphs 4 to 6 and 9 *supra.*

(iii) The continued gauging of the available water-supply.

(iv) Submission of a preliminary report with rough estimate of probable cost, probable revenues, return on capital expenditure, and opinion of the Madras Government on the advisability of preparing a detailed project.

J. Benton,
Inspector-General of Irrigation.

Order—No. 4 I., dated 10th January 1910.

The following letter will be despatched to the Government of India.

[Here enter letter No. 5 I., dated 10th January 1910.]

(True Extract.)

C. A. Smith,
Joint Secretary to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation
Copy to the Revenue Department } with copy of letter and notes.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

No. 5 I.

Irrigation.
Establishment.

LETTER—from

C. A. SMITH, ESQ.,
Joint Secretary to the Government of Madras,
Public Works Department,
Irrigation Branch.

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
REVENUE AND AGRICULTURAL DEPARTMENT.

SIR,

I am directed to invite a reference to your letter No. 1060F./269-2, dated the 18th October 1909, conveying the approval of the Government of India to the proposal o have the catchment area of the Periyar lake surveyed by No. 19. Survey of India Party.

2. A scheme is now under the consideration of His Excellency in Council for supplementing the supply of water in the Periyar Reservoir by the diversion of the Pambiyar river into it, and I am to refer you to a note written by the Inspector-General of Irrigation in this connection, a copy of which was forwarded to this Government, with Mr. Jacob's letter No. 2207-I., dated the 8th December 1908. It will be seen that Mr. Benton recommends the execution of certain surveys and the carrying out of investigations as regards storage requirements and possibilities and other matters connected with the scheme. Now that the Government of India are arranging to have the catchment area of the Periyar surveyed by one of the Survey of India Parties, the Chief Engineer considers it highly desirable that the Pambiyar catchment should be surveyed at the same time. This survey is an essential preliminary to the scheme, and should be carried out before the investigations indicated in the Inspector-General's note are undertaken, if satisfactory results are to be obtained.

3. I am in these circumstances directed to request that the Government of India will be pleased to arrange for this survey also being carried out by No. 19. Survey of India Party.

I have the honour to be,
Sir,
Your most obedient servant,

C. A. SMITH,
Joint Secretary to Government, P.W.D.,
Irrigation Branch.

MADRAS,
10th January 1910.